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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

SHAH, PARAS D

ART UNIT

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/019,883	Applicant(s) YUAN ET AL.	
	Examiner PARAS SHAH	Art Unit 2626	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06/06/2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This communication is in response to the Arguments and Amendments filed on 06/06/2008. Claims 1-15 remain pending and have been examined. The Applicants' amendment and remarks have been carefully considered, but they do not place the claims in condition for allowance.
2. All previous objections and rejections directed to the Applicant's disclosure and claims not discussed in this Office Action have been withdrawn by the Examiner.

Change of Examiner

3. It should be noted that the Examiner of record for this Application has changed from Luis Salazar to Paras Shah and the Art Unit has changed from 4192 to 2626.

Response to Arguments

4. Applicant's arguments in the Appeal Brief (pages 9-11) filed on 06/06/2008 with regard to claims 1-15 have been fully considered and they are persuasive. Acknowledgement has been made in regards to the "Statement of Common Ownership" under 35 U.S.C. 103(c) and the secondary reference by Yan (US 6,789,063) has been withdrawn from consideration. However, a new grounds for rejection has been made using a newly cited reference. See below for the relevant claim mapping.

Claim Objections

5. Claims 11-15 are objected to because of the following informalities: The term “machine-readable medium” in claims 11-15 should be –computer readable storage medium”. Appropriate correction is required. Claims 12-15 are objected to as being dependent upon an objected to base claim.

Claim Rejections - 35 USC § 101

6. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-15 are directed toward non-statutory subject matter.

Claims 1-15 are directed towards a method for recognizing an input speech of a word sequence. To be statutory, a claimed process must either: (A) result in a physical transformation for which a practical application is either disclosed in the specification or would have been known to a skilled artisan (B) be limited to a practical application which produces a useful, tangible, and concrete result. See *Diehr*, 450 U.S. at 183-84, 209 USPQ at 6 (quoting *Cochrane v. Deener*, 94 U.S. 780, 787-88 (“A [statutory] process is a mode of treatment of certain materials to produce a given result. It is an act, or a series of acts, performed upon the subject matter to be transformed reduced to a different state or thing.... The process requires certain things should be done with certain substances, and in a certain order; but the tools to be used in doing this may be of secondary consequence.”)). In the present, case claims 1, 6, and 11 refers to an algorithm for receiving speech and grouping phoneme clusters, there is no output being defined that causes there to be a tangible result and there is no physical transformation

of the input sequence of words. Rather, there appears to be an algorithm grouping phonemes in clusters and determining whether a second cluster is needed.. Since the presently claimed invention neither performs a transformation, nor actively produces a useful, concrete and tangible result claims, 16, 23 ,and 24 are directed towards non-statutory subject matter.

As such, claims 1, 6, and 11 are directed towards non-statutory subject matter. The dependent claims 2-5, 7-10, and 12-15 fail to overcome 35 U.S.C. 101 rejection directed towards independent claim 1, 6, and 11.

Claims 11-15 are drawn to a "signal" *per se* as recited in the preamble and as such is non-statutory subject matter. On page 5, 2nd full paragraph of the Specification, reference to the machine readable medium is being made to include mechanism for storing and transmitting and further defines the program code to be represented as carrier wave signals, which can be interpreted to be the transmission of signals. It does not appear that a claim reciting a signal encoded with functional descriptive material falls within any of the categories of patentable subject matter set forth in § 101. First, a claimed signal is clearly not a "process" under § 101 because it is not a series of steps. The other three § 101 classes of machine, compositions of matter and manufactures "relate to structural entities and can be grouped as 'product' claims in order to contrast them with process claims." 1 D. Chisum, Patents § 1.02 (1994).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1-15 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Kao et al. (U.S. Patent: 6,317,712 B1), hereinafter referred as Kao, in view of Alleva *et al.* (U.S. Patent: 5,794,197), hereinafter referred as Alleva.

As per claims 1 and 11, Kao teaches a speech processing method comprising:

receiving speech signals (Kao, figure 3, subblock 11, collects speech data);

processing the received speech signals (Kao, figure 3, subblock 12 and 13, training of triphone models);

to generate a plurality of phoneme clusters (Kao, figure 3, subblock 14, clustering of triphone by decision tree);

grouping the plurality of phoneme clusters into a first cluster node and a second cluster node, wherein the first cluster node comprises at least one phoneme cluster from the plurality of phoneme clusters (Kao, figure 3, subblock 14, clustering triphones; figure 4, figure of tree shown and see col. 3, lines 47-55, clustering is done initially with all phoneme models and cluster according to a yes/no relationship.).

Kao does not explicitly teach determining automatically if a phoneme cluster in the first cluster node is to be moved into the second cluster node based on a likelihood increase of the phone cluster of the first cluster node from being in the first cluster node to being in the second cluster node.

However, Alleva teaches determining automatically when the at least one phoneme cluster in the first cluster node is to be moved into the second cluster node (see Figure 2, step 56, root node is divided) based on a likelihood increase of the phone cluster of the first cluster node from being in the first cluster node to being in the second cluster node (see step 56, greatest entropy decrease is utilized for moving into a second node.).

Kao and Alleva are analogous art because they are from a similar field of endeavor in speech processing and large vocabulary speech recognition applications. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the speech processing as taught by Kao with the determination when one cluster being moved into another cluster as taught by Alleva for the purpose of improving speech recognition accuracy and modeling of triphones (see Alleva, col. 3, lines 5-7)

As to claim 11, the limitations in this claim are similar in scope to claim 1 and are rejected and further Kao teaches the machine-readable medium (see col. 2, lines 20-21, CD-ROM and software).

As per claims 2 and 12, Kao, in view of Alleva, teaches the speech processing method as claimed in claim 1.

Furthermore, Alleva teaches moving the at least one phoneme cluster in the first cluster node into the second cluster node when the at least one phoneme cluster in the first cluster node is determined to be moved into the second cluster node (see Figure 2, step 58, subsequent nodes are divided in direction of greatest decrease in entropy).

As per claims 3 and 13, Kao, in view of Alleva, teaches the speech processing method as claimed in claim 2.

Furthermore, Alleva teaches moving the at least one phoneme cluster in the first cluster node into the second cluster node when the most likelihood increase is more than a threshold value (see Figure 2, step 58 and col. 6, lines 59-64, subsequent nodes are divided in direction of greatest decrease in entropy) (e.g. The dividing stops when entropy is below a threshold but continues if it is above.).

As per claims 4 and 14, Kao, in view of Alleva, teaches the speech processing method as claimed in claim 1.

Furthermore, Kao teaches wherein the phoneme clusters are triphone clusters based on a hidden markov model (HMM) (see col. 3, line 41; "Applicants teach to tie triphone HMMs").

As per claims 5 and 15, Kao, in view of Alleva, teaches the speech processing method as claimed in claim 1.

Furthermore, Alleva teaches grouping the triphone clusters according to answers to best phonetic context based questions related to the triphone clusters (see Figure 3, and col.7, lines 39-44, answers to the questions are formed based on the yes-no relationships when traversing through the tree (see col. 6, lines 50-54).

As per claim 6, Kao teaches a speech processing system comprising:

- an input to receive speech signals (Kao, figure 1, subblock MIC, figure 2, subblock MIC);

- a processing unit (see col. 2, lines 18-20, PC) to:

- process received speech signals (Kao, figure 3, subblock 12 and 13, training of triphone models);

- generate a plurality of phoneme clusters (Kao, figure 3, subblock 14, clustering of triphone by decision tree);

- group the plurality of phoneme clusters into a first cluster node and a second cluster node, wherein the first cluster node comprises at least one phoneme cluster from the plurality of phoneme clusters (Kao, figure 3, subblock 14, clustering triphones; figure 4, figure of tree shown and see

col. 3, lines 47-55, clustering is done initially with all phoneme models and cluster according to a yes/no relationship.).

Kao does not explicitly teach determining automatically if a phoneme cluster in the first cluster node is to be moved into the second cluster node based on a likelihood increase of the phone cluster of the first cluster node from being in the first cluster node to being in the second cluster node.

However, Alleva teaches determining automatically when the at least one phoneme cluster in the first cluster node is to be moved into the second cluster node (see Figure 2, step 56, root node is divided) based on a likelihood increase of the phone cluster of the first cluster node from being in the first cluster node to being in the second cluster node (see step 56, greatest entropy decrease is utilized for moving into a second node.).

Kao and Alleva are analogous art because they are from a similar field of endeavor in speech processing and large vocabulary speech recognition applications. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the speech processing as taught by Kao with the determination when one cluster being moved into another cluster as taught by Alleva for the purpose of improving speech recognition accuracy and modeling of triphones (see Alleva, col. 3, lines 5-7)

As per claim 7, Kao, in view of Alleva, teaches the speech processing system as claimed in claim 6.

Furthermore, Alleva teaches moving the at least one phoneme cluster in the first cluster node into the second cluster node when the at least one phoneme cluster in the first cluster node is determined to be moved into the second cluster node (see Figure 2, step 58, subsequent nodes are divided in direction of greatest decrease in entropy).

As per claim 8, Kao, in view of Alleva, teaches the speech processing system as claimed in claim 7.

Furthermore, Alleva teaches moving the at least one phoneme cluster in the first cluster node into the second cluster node when the most likelihood increase is more than a threshold value (see Figure 2, step 58 and col. 6, lines 59-64, subsequent nodes are divided in direction of greatest decrease in entropy) (e.g. The dividing stops when entropy is below a threshold but continues if it is above.).

As per claim 9, Kao, in view of Alleva, teaches the speech processing system as claimed in claim 6.

Furthermore, Kao teaches wherein the phoneme clusters are triphone clusters based on a hidden markov model (HMM) (see col. 3, line 41; “Applicants teach to tie triphone HMMs”).

As per claim 10, Kao, in view of Alleva, teaches the speech processing system as claimed in claim 9.

Furthermore, Alleva teaches grouping the triphone clusters according to answers to best phonetic context based questions related to the triphone clusters (see Figure 3, and col.7, lines 39-44, answers to the questions are formed based on the yes-no relationships when traversing through the tree (see col. 6, lines 50-54).

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Robinson (US 5,983,180) is cited to disclose recognition of data using models organized in a tree. Hab_Umbach et al. (US 5,995,930) is cited to disclose spoken word recognition through organizing vocabulary in a tree structure. Hirayama (US 6,112,173) is cited to disclose utilization of a tree structure for a phoneme. Acero *et al.* (US 6,163,769) is cited to disclose storing clustered phoneme units.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to PARAS SHAH whose telephone number is (571)270-1650. The examiner can normally be reached on MON.-THURS. 7:00a.m.-4:00p.m. EST.

Art Unit: 2626

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Edouard can be reached on (571)272-7603. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/P. S./
Examiner, Art Unit 2626

08/25/2008

/Patrick N. Edouard/

Supervisory Patent Examiner, Art Unit 2626